



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|-----------------------------------|------------------|
| 10/501,121 | 02/28/2005 | Hiroto Kokubun | 1141/72716 | 6064 |
| 23432 7590 03/13/2007 COOPER & DUNHAM, LLP 1185 AVENUE OF THE AMERICAS NEW YORK, NY 10036 | | | EXAMINER BOR, HELENE CATHERINE | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 3768 | |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | MAIL DATE | DELIVERY MODE | |
| 3 MONTHS | | 03/13/2007 | PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

* SUPPLEMENTAL *

Office Action Summary

Application No.

10/501,121

Applicant(s)

KOKUBUN ET AL.

Examiner

Helene Brown

Art Unit

3768

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07/09/2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Abstract

2. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. **The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided.** The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

Specification

3. The disclosure is objected to because of the following informalities:
 - a. Page 12, Line 15 & Page 18, Line 7 – “tomogam” is spelled wrong.
 - b. Page 10, Line 4 – “can be detected speedy” is improper and *can be detected rapidly* would be more appropriate.

Appropriate correction is required. It is also recommend that the specification be proofread for other misspellings and grammatical errors.

Drawings

4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character “7d” has been used to designate both a sample tomogam creating means and plural tomogram creating means. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character “7f” has been used to designate both a perfect tomogram rearrangement processing means and another image reconstituting means. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Art Unit: 3768

5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: 16b, 16b, & 16d. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Acknowledgement for Invoking 35 USC § 112, Sixth Paragraph

For the record, the examiner acknowledges the applicant for invoking 35 USC § 112, Sixth Paragraph, which states:

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

As such, the claim limitations are being treated under 35 U.S.C. 112, sixth paragraph.

However, if a claim limitation does not use the phrase "means for" or "step for," the examiner will not treat such a claim limitation under 35 U.S.C. 112, sixth paragraph.

Claim Objections

6. Claim 1-19 are objected to because of the following informalities: the usage of "characterized in" or "characterized by". Appropriate correction is required. Let it be of record that the usage of such in the claims has been interpreted to read, "wherein the improvement comprises."

Claim Rejections - 35 USC § 102(b)

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claim 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Lutz'051 (US Patent No. 5,832,051).

Claim 1: Lutz'051 teaches an apparatus for generating a tomographic image (Figure 1, Element 1). Lutz'051 teaches reconstructing projection data acquired by scanning a predetermined slice of a subject (Col. 2, Line 38-41). Lutz'051 teaches detecting means for detecting a static cardiac time phase (Col. 2, Line 25-30) in a subject based on heartbeat information acquired in association with the projection data (Col. 3, Line 27-32). Lutz'051 also teaches image reconstructing means for generating the tomographic image by reconstructing projection data corresponding to the static cardiac time phase detected by the detecting means (Col. 2, Line 52-58).

Claim 2: Lutz'051 teaches an apparatus characterized in that the detecting means detects the static cardiac time phase based on correlation data between the heartbeat

information and the static cardiac time phase that are previously determined to each subject (Col. 2, Line 18-25).

Claim 3: Lutz'051 teaches an apparatus characterized in that the correlation data is prepared to each of different portions of the subject (Col. 2, Line 12-13), and the detecting means comprises input means for setting the predetermined portions (Col. 2, Line 44-46).

Claim 4: Lutz'051 teaches an apparatus characterized in that the correlation data includes at least a correlation between a heartbeat rate and static cardiac time phase (Col. 3, Line 38-47).

Claim 5: Lutz'051 teaches an apparatus characterized by comprising memory means (Figure 1, Element 8) for storing the projection data acquired over a plurality of heart beat cycles and a projection data synthesizing means for reading the projection data corresponding to the static cardiac time phase detected by the detecting means and synthesizing the projection data, wherein the image reconstructing means reconstructs the projection data synthesized by the projection data synthesizing means (Col. 8, Line 28-33).

Claim Rejections - 35 USC § 102(e)

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claim 1-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Flohr'487 et al. (US Patent No. 6,381,487 B1).

Claim 1: Flohr'487 teaches an apparatus for generating a tomographic image (Col. 1, Line 6-7). Flohr'487 teaches reconstructing projection data acquired by scanning a subject (Col. 2, Line 13-25). Flohr'487 teaches detecting means for detecting a static cardiac time phase in a subject based on heartbeat information acquired in association with the projection data (Col. 2, Line 23-25). Flohr'487 also teaches image reconstructing means for generating the tomographic image by reconstructing projection data corresponding to the static cardiac time phase detected by the detecting means (Col. 2, Line 27-35).

Claim 2: Flohr'487 teaches an apparatus wherein the improvement comprises that the detecting means detects the static cardiac time phase based on correlation data between the heartbeat information and the static cardiac time phase that are previously determined to each subject (Col. 2, Line 42-54).

Claim 3: Flohr'487 teaches an apparatus wherein the improvement comprises that the correlation data is prepared to each of different portions of the subject (Col. 7, Line 19-21), and the detecting means comprises input means for setting the predetermined portions (Col. 7, Line 32-37).

Claim 4: Flohr'487 teaches an apparatus wherein the improvement comprises that the correlation data includes at least a correlation between a heartbeat rate and static cardiac time phase (Col. 2, Line 23-25).

Claim 5: Flohr'487 teaches an apparatus wherein the improvement comprises memory means (Figure 10, Element 11) for storing the projection data acquired over a plurality of heart beat cycles and a projection data synthesizing means for reading the projection

data corresponding to the static cardiac time phase detected by the detecting means (Col. 2, Line 23-25) and synthesizing the projection data, wherein the image reconstructing means reconstructs the projection data synthesized by the projection data synthesizing means (Col. 2, Line 27-35).

Claim 6: Flohr'487 teaches an apparatus wherein the improvement comprises the detecting means comprising a sample tomographic image rearranging means for generating a plurality of sample tomographic images having a different cardiac time phase based on the projection data and the heartbeat information and selecting means for selecting a sample tomographic image with a small amount of motion artifacts from the plurality of sample tomographic images, wherein the image reconstructing means generates the tomographic image by reconstructing projection data corresponding to the cardiac time phase of the sample tomographic image selected by the selecting means (Col. 2, Line 10-40).

Claim 7: Flohr'487 teaches an apparatus wherein the improvement comprises that an image size of the sample tomographic image is set smaller than that of the tomographic image (Col. 7, Line 65 – Col. 8, Line 5).

Claim 8, 9 & 10: Flohr'487 teaches an apparatus wherein the improvement comprises the selecting means calculates an integrated value of a CT value of each of the plurality of sample tomographic images images having the different cardiac time phase in a predetermined region, and selects a sample tomographic image with a smallest fluctuation of the integrated value of the CT value and selects a sample tomographic image having a largest correlation (Col. 5, Line 53 – Col. 6, Line 7).

Art Unit: 3768

Claim 11: Flohr'487 teaches an apparatus wherein the improvement comprises memory means for storing the projection data acquired over a plurality of heart beat cycles and projection data synthesizing means for reading the projection data corresponding to the cardiac time phase of the sample tomographic image selected by the selecting means and synthesizing the projection data, wherein the, the image reconstructing means reconstructs the projection data synthesized by the projection data synthesizing means (Col. 2, Line 27-35).

Claim 12: Flohr'487 teaches an apparatus wherein the improvement comprises that the sample tomographic image generating means generates the plurality of sample tomographic images in a predetermined cardiac time phase range determined based on the correlation data between the heartbeat information and the static cardiac time phase that are determined previously (Figure 11).

Claim 13: Flohr'487 teaches an apparatus wherein the improvement comprises that the correlation data is prepared to each of different portions of the subject (Col. 7, Line 19-21), and the detecting means comprises input means for setting the predetermined portions (Col. 7, Line 32-37).

Claim 14: Flohr'487 teaches an apparatus wherein the improvement comprises that the correlation data includes at least a correlation between a heart rate and a static cardiac time phase (Col. 2, Line 23-25).

Claim 15: Flohr'487 teaches an imaging method of generating a tomographic image (Col. 1, Line 6-7) by reconstructing projection data acquired by scanning a predetermined slice of a subject, wherein the improvement comprises a static cardiac

time phase with a small amount of motion artifacts (Col. 2, Line 55-57) is detected in a predetermined portion of the subject based on heartbeat information acquired in association with the projection data (Col. 2, Line 23-25) and the tomographic image is generated by reconstructing projection data corresponding to the detected static cardiac time phase (Col. 2, Line 27-35).

Claim 16: Flohr'487 teaches an imaging method wherein the improvement comprises that correlation data between the heartbeat information and the cardiac time phase is previously acquired to each subject, and the static cardiac time phase is detected, based on the correlation data (Figure 11).

Claim 17: Flohr'487 teaches an imaging method wherein the improvement comprises a plurality of sample tomographic images having a different cardiac time phase are generated based on the projection data and the heartbeat information, a sample tomographic image with a small amount of motion artifacts is selected from the plurality of sample tomographic images, and a cardiac time phase corresponding to the selected sample tomographic image is used as a static cardiac time phase (Col. 2, Line 13-27).

Claim 18: Flohr'487 teaches an imaging method wherein the improvement comprises that an image size of the sample tomographic image is set smaller than that of the tomographic image (Col. 7, Line 65 – Col. 8, Line 5).

Claim 19: Flohr'487 teaches an imaging method wherein the improvement comprises that correlation data between the heartbeat information and the static cardiac time phase are previously acquired to each subject (Figure 11) and the plurality of sample

images are generated in a predetermined cardiac time phase range determined based on the correlation data (Col. 2, Line 27-35).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Osamu Miyazaki et al., US Patent No. 5,987,091, teaches an X-ray CT system; Tetsuya Horiuchi et al., US Patent No. 5,991,356, teaches a radiation tomography method and apparatus; Pingyu Liu, US Patent No. US 6,233,478, teaches an apparatus and method for constructing computed tomography image slices of an object undergoing cyclic motion; Jiang Hsieh, US Patent No. 6,421,552, teaches methods and apparatus for estimating cardiac motion using projection data.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helene Brown whose telephone number is 571-272-2947. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eleni Mantis-Mercader can be reached on 571-272-4740. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Helene Brown
Eleni Mantis-Mercader
SHE 3768

Art Unit: 3768

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

hcb